

ABSTRACT

A low-power, plasma source-based, portable molecular light emission generator/detector employing an atmospheric pressure pulsed-plasma for molecular fragmentation and excitation is described. The average power required for the operation of the plasma is between 0.02 W and 5 W. The features of the optical emission spectra obtained with the pulsed plasma source are significantly different from those obtained with direct current (dc) discharge higher power; for example, strong CH emission at 431.2 nm which is only weakly observed with dc plasma sources was observed, and the intense CN emission observed at 383–388 nm using dc plasma sources was weak in most cases. Strong CN emission was only observed using the present apparatus when compounds containing nitrogen, such as aniline were employed as samples. The present apparatus detects dimethylsulfoxide at 200 ppb using helium as the plasma gas by observing the emission band of the CH radical. When coupled with a gas chromatograph for separating components present in a sample to be analyzed, the present invention provides an apparatus for detecting the arrival of a particular component in the sample at the end of the chromatographic column and the identity thereof.